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Initial census, woody seedling, seed rain, and stand structure data for the SCBI SIGEO Large Forest Dynamics Plot

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Abstract. We present data from the first five years (2008–2012) of the establishment of the 25.6-ha Smithsonian Conservation Biology Institute (SCBI) Large Forest Dynamics Plot, comprising the initial woody stem census, woody seedling plot surveys, seed rain, and dendrochronological data. The plot is in mature secondary mixed deciduous forest 5 km south of Front Royal, Virginia, USA. The initial plot census enumerated 38 932 free-standing living stems and 29 991 living individuals $\geq$1 cm dbh comprising 62 species, 38 genera, and 26 families, along with an additional 1248 dead/missing standing stems, for a total of 40 180 stems. Dominant canopy trees include tulip poplar (*Liriodendron tulipifera*), hickories (*Carya* spp.), oaks (*Quercus* spp.), white ash (*Fraxinus americana*), and black gum (*Nyssa sylvatica*). Prominent understory components include spicebush (*Lindera benzoin*), pawpaw (*Asimina triloba*), American hornbeam (*Carpinus caroliniana*), witchhazel (*Hamamelis virginiana*), and eastern redbud (*Cercis canadensis*). Few species predominate numerically on the plot; seven species have >1000 individuals (71.3% of the total). Mean stand density was 1179 living individuals/ha, while mean basal area was 34.1 m^2/ha. Of the total plot area, 4 ha have had white-tailed deer (*Odocoileus virginianus*) exclusion since 1990. Woody seedling surveys from 2010–2012 in 354 1-m^2 plots measured 19 415 seedlings of 47 species, from new germinants up to 1 cm dbh. Community-wide seed rain data from 200 0.5-m^2 litterfall traps yielded a total of 9197 records from 37 species. Long-term seed data collected from 1986–2011 for *Quercus* and *Carya* within the exclosure and two replicate sites are also presented, documenting considerable annual variation in mast production. Dendrochronological data from 492 tree cores suggested the major canopy trees established circa 1900, but scattered trees of several species existed earlier. Large-scale forest dynamics plots employing standardized methodology have a long, rich history in the tropics. Similar plots in the temperate zone have been largely lacking, however. The SCBI plot represents one of the first of its kind in the Smithsonian Global Earth Observatory's recently established network of such plots, complementing its well-known network of tropical forest plots and enabling comparative studies on forest ecology and climate change at the global scale.

Key words: *census; deer exclusion; dendrochronology; mast production; seed rain; seedling dynamics; temperate forest; temperate trees.*

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